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INSTRUCTIONS FOR BIRD BANDING

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Banded Brown Thrasher

B1552M

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BIRD BANDING in America dates from the early years of the nineteenth century, when Audubon placed silver threads around the legs of a brood of phoebes, and was rewarded the following season by having two of his birds return to nest in the same vicinity.

In Europe bird banding was attempted as early as 1710, but it was not until 1899 that it was undertaken systematically. Between that year and 1914 about twenty different organizations took up the work, and their activities have developed much valuable information.

In the United States active experimental work was begun in 1901, and between that year and 1909 several local attempts at bird banding were either planned or prosecuted. One of these, by the New Haven (Conn.) Bird Club, was reported to the annual meeting of the American Ornithologists' Union in 1909, with the result that the American Bird Banding Association was organized in New York City on December 8, of that year. This association continued to advance the work (during the last few years under the auspices of the Linnaean Society of New York) until it outgrew the resources available.

Because of the valuable information to be secured relative to the movements and life histories of our migratory birds, especially the game and insectivorous species, the work of the association was taken over by the Biological Survey in 1920. It is the plan of the Survey to advance this method of research along two principal lines: First, by the banding of fledglings as formerly practiced; and second, by the systematic trapping and banding of adults.

INSTRUCTIONS FOR BIRD BANDING.

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INTRODUCTION.

THROUGH BIRD-BANDING operations, as carried on in Europe and America, large numbers of migratory birds have been banded, and data of considerable importance obtained during the last 20 years. In the United States these activities have received added impetus within the last year or two, through the evolution of the method of systematic trapping.¹ Birds have been marked in various ways, but the most satisfactory is by means of a numbered aluminum band or ring, attached to the tarsus, or bare portion of the leg. The application of a stain or dye to the flight or tail feathers, the attaching of memoranda written on parchment, and various other devices have been tried in the past, but are not satisfactory for any general investigation.

Since it is the returns from birds banded that furnish the data desired in this branch of research, it is of prime importance that the methods employed be improved and that the percentage of birds under observation be increased. Nothing has been found more satisfactory to the accomplishment of this than systemized trapping.² As the banding of fledglings has the advantage of affording valuable information on the ages of birds, the Biological Survey wishes to encourage these activities, but it desires to lay special emphasis on the added value of the systematic trapping of adults.

With the establishment of a well-connected chain of trapping stations (see fig. 1) throughout the United States and Canada, regular "returns" are confidently expected through reports of retrapping

¹ Baldwin, S. Prentiss, Bird-banding by means of systematic trapping: Abstr. Proc. Linnaean Soc. New York, no. 31, pp. 23-56, pls. I-VII, 1919.

² Federal permit for this work is required, under the provisions of the migratory-bird treaty act. Application for such permit should be addressed to the Bureau of Biological Survey, U. S. Department of Agriculture, Washington, D. C.

birds that were banded at the original and other stations. Data thus afforded are already indicating the exact line of migration of individual birds, the speed of travel, and innumerable items of interest, many of which have a direct bearing upon the study of life histories. A lively interest attaches to the work in that each operator of a station is in a continual state of anticipation through the knowledge that birds banded at other stations may at any time be registered at his own traps.

The bands issued by the Biological Survey are of two types, a split-ring band (sizes 1 to 6, inclusive) for all small birds, including

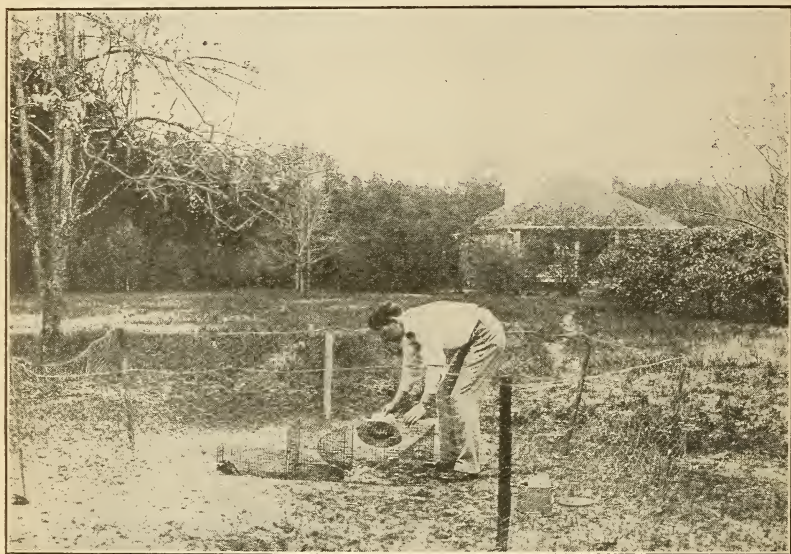


FIG. 1.—Typical trapping station, showing well-placed trap and gathering cage inside guard fence. (Photograph from S. Prentiss Baldwin.)

those of the size of crows, small owls, and herons; and a flat-strip band that is adjustable for all larger birds. For general land bird trapping, the Government sparrow trap has been found the most satisfactory. Other traps (there are several that may be purchased in the open market) may also give satisfaction, but there is a distinct advantage in having a standard type that birds may come to recognize as a source of food, and for this reason it is recommended that this trap be used.

"GOVERNMENT" SPARROW TRAP.

The following specifications are sufficient to enable anyone with moderate skill in the use of tools (tin snips, pliers, file, and hammer) to construct the "Government"³ sparrow trap in a few hours and at a

³ Specifications for the so-called "Government" sparrow trap were first published in *Farmers' Bulletin* 493, issued April 20, 1912.

nominal cost, or the services of a tinner or sheet-metal worker may be employed. Galvanized hardware cloth of not to exceed $\frac{1}{2}$ -inch mesh is the material used.

The essential parts of this trap are: (1) A half funnel leading into (2) an antechamber that ends in (3) a complete funnel with outlet slightly elevated, opening into (4) a second chamber, and (5) a number of blunt wires that are attached to the outlets of of

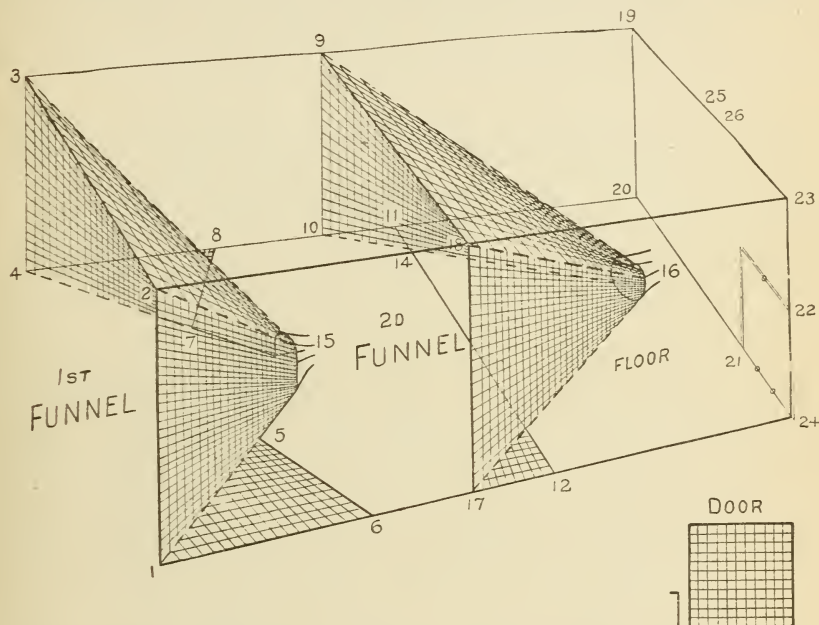


FIG. 2.—Details of construction of Government sparrow trap, similar to that in operation in figure 1. Relative position of funnels and door is shown. The numbers at the angles correspond to those in figures 3, 4, and 5.

the funnels and project into the respective chambers (see fig. 2). These wires should be about 3 inches long on the first funnel and about 2 inches long on the second.

The plans outlined in these pages are for a trap 36 inches long, 18 inches wide, and 12 inches high, a good size for most work, as it is not cumbersome or heavy. A larger trap might be used to advantage at stations where the conditions would not necessitate its being much moved about.

CONSTRUCTION OF TRAP.

Two rectangular frames measuring 36 by 12 inches are first bent into shape from No. 8 or No. 10 wire of moderate stiffness. This kind of wire is also used for the framework of the door in the second chamber and to reinforce the netting around the doorway

and the mouths of the funnels. It is well, though not strictly necessary, to solder the joints to insure additional rigidity. To start construction one of these wire rectangles is placed lengthwise (see fig. 3) on one corner of a strip of the hardware cloth measuring 42 by 48 inches, and is securely laced thereto with copper wire of about No. 20 size, such as is commonly sold on wooden spools. One side is thus formed. Before proceeding further a piece of netting, 18 inches by 12 inches, is snipped out of the middle of that part of the netting projecting beyond the frame. This piece is saved for the floor of the second chamber. The netting is then bent

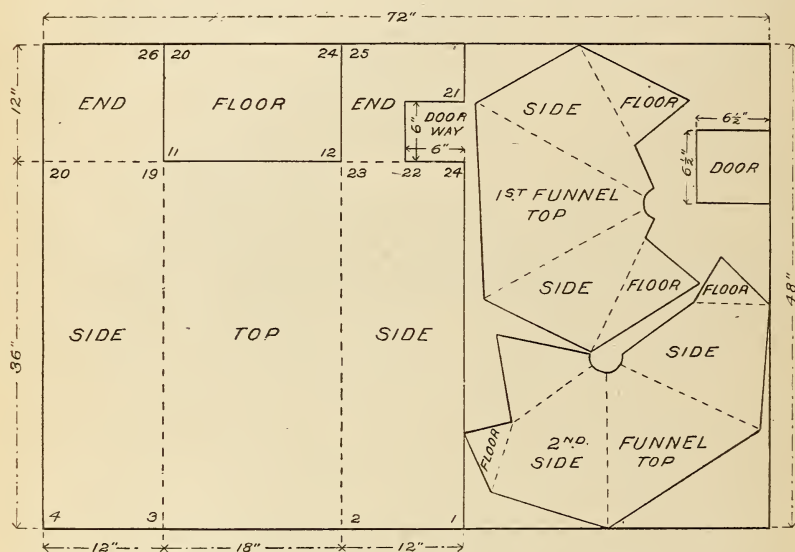


FIG. 3.—Diagram for cutting galvanized hardware cloth 72 by 48 inches for construction of trap measuring 36 by 18 by 12 inches, outlined in figure 2.

twice to form the top (18 inches by 36 inches) and the second side. To the last the other wire frame is laced in the same fashion as was the first.

A simple manner of securing straight bends in the netting is as follows: Place the netting on the floor, lay a board across it with one edge along the line where the bend is desired, stand on the board, and bend the netting up, tapping it lightly with a hammer against the edge of the board. A straight, even, right-angle bend will result.

The bends should be made so as to bring the heavy framework on the inside. At this stage the top and sides are completed, the latter with projections measuring 12 by 12 inches beyond the framework at one end. These should be bent in to form the back and laced together and to the top with the copper wire. They will now lap over each other about 6 inches.

The opening for the door (6 inches square) is then snipped out of one of the lower corners of the back, and the edges are reinforced with a piece of the heavy wire. If the netting is cut so as to leave the wires projecting from the last row of squares, these may be bent around the reinforcing wire, thus adding smoothness to strength.

A narrow strip (about 3 or 4 inches wide) of fine screen or netting should now be fastened along the lower portion of the sides and back. Ordinary window-screen wire will answer, although the galvanized netting of about one-eighth inch mesh is preferable. This will pre-

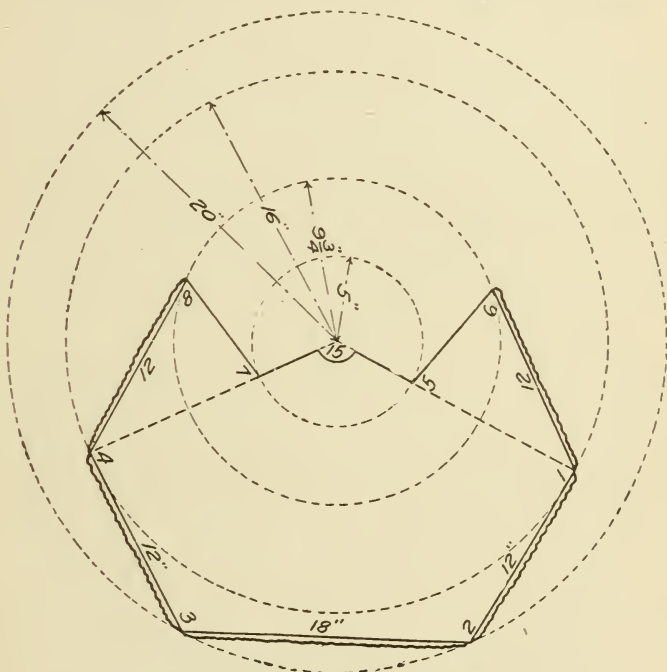


FIG. 4.—Pattern for first funnel of trap shown in figure 2.

vent small birds from injuring themselves by trying to force through the larger meshes.

The funnels are next prepared. Paper patterns are first made, as shown in figures 4 and 5, by drawing the concentric circles and then laying off the straight lines, beginning with the longest. To draw large circles, lay the paper on the floor, drive a nail for a center, and attach a string to it; with this string and a pencil circles of any desired radius may be easily drawn.

The outlets from the funnels should be large enough to allow birds of the size of jays, thrashers, and robins to pass through. Several blunt wires (about the size of baling wire) are attached to the outlets so that they will project into the first and second chambers 3 inches and 2 inches, respectively. These may be secured to the funnels

marily to give strength. Bait shows to better advantage on the bare ground, and it is frequently necessary to remove a bird from this chamber, a matter of considerable difficulty if the floor is completely filled in.

The door is readily constructed by attaching a piece of netting to a wire frame. It should be hinged at the bottom so as to drop against the floor of the trap, and the wire forming the bottom or axle should project an inch or two beyond the side. This is then given two right-angle bends to form a crank by means of which the door is lowered when a bird is to be transferred to the gathering cage. The door should be about $6\frac{1}{2}$ inches square.

See that all projecting wires in the netting are bent down smoothly. Greater strength may be secured by bending these around the framework at the sides and by weaving them into the connecting pieces.

This trap has the advantage of being always set, of being suitable for all small birds up to and including those of the size of robins and jays, of having no loose parts to become disarranged, and thus of requiring no tools to keep it in order. It is not heavy and when painted a leaf green will be inconspicuous and will not frighten the birds.

GATHERING CAGE.

Do not attempt to seize a bird in the trap chambers if it is possible to prevent it. Use a small gathering cage and drive the birds into it gently, thereby eliminating much of the fluttering that is bound to occur in the larger spaces of the trap. A gathering cage is readily constructed from a piece of hardware cloth 1 foot wide and 2 feet long. This will make a cage 12 inches long and 6 inches square (the size of the doorway in the trap). A piece of netting is laced in to form the back, and the door is made to operate in the same manner as that in the trap. The door should drop inward in each case and lie flat on the bottom when the cage is open.

OTHER METHODS OF TRAPPING.

Where premises are large enough to justify establishing a permanent station, a house trap constructed as follows will give excellent service: Select a location adjacent to trees or shrubbery and erect a framework about 5 feet square and 6 feet high, of 2-inch uprights, such as may be made by splitting 2 x 4 timbers, lengthwise. Three extra uprights will be needed to form a vestibule and for casings for the doors (see fig. 6). Cover this framework with woven-wire netting of small mesh, not to exceed $\frac{3}{4}$ inch. Stretch a piece of the netting between two extra uprights that are 2 feet apart and 18 inches from one side, thus making a vestibule or partial partition in the trap. A door frame is made of light, narrow pieces of lumber, cov-

ered with the wire netting and hinged so that it will open *into* the vestibule. The inner opening is provided with two half doors, of which only the tops and hinged sides are of wood. The inner edges and bottoms are formed by a heavy wire (or a $\frac{1}{4}$ -inch soft iron rod), which serves merely to stiffen the netting. This provides a minimum of visual obstruction to any bird that may be entering. By leaving these doors partly open an effective funnel trap is produced. The

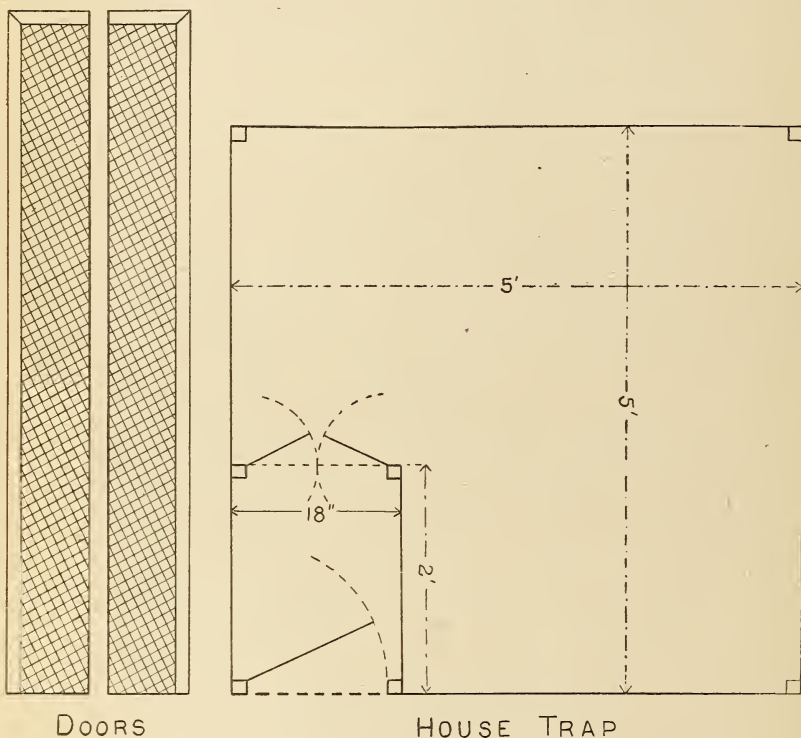


FIG. 6.—Ground plan of house trap, showing vestibule and position of doors when trap is set.

outer door should also be left ajar a few inches. Figure 6 illustrates the ground plan and shows the correct position of the doors when the trap is set. A trap of this type operated by the writer at the National Zoological Park in 1920 was very satisfactory, catching thrushes, orioles, warblers, and many other species that seem loath to enter the smaller traps.

Various other methods of trapping birds for banding will suggest themselves to the operator. It must be remembered, however, that birds are likely to become more or less frightened when caught in any trap, and traps that will grasp or seize them must not be used except in special cases.

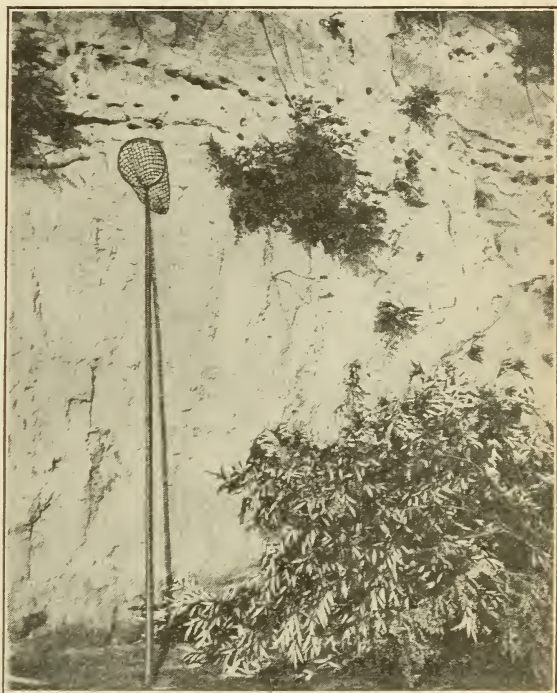
Catching small birds at their nests by means of horsehair snares should be resorted to only when the operator remains within sight of the nest, ready to release the captured bird immediately. Generally, this method should be employed only when observation has shown that one or both owners of the nest wear bands, the numbers on which it is desirable to learn without harm to the carrier.

Bird lime should not be used under any circumstances, as it is virtually impossible to release in good condition a bird that has been so caught.

Almost all nest boxes may be equipped with some simple device that will enable the operator to capture and band the occupants with their brood.

The short-handled net used in connection with the operation of the house trap is an excellent implement for capturing occupants of nest boxes. A light pole of suitable length is lashed firmly to the net handle and the bird is deftly captured as it leaves the box opening. This net may also be satisfactorily employed to capture such birds as bank swallows and rough-winged swallows, kingfishers, and others (see fig. 7).

The banding of waterfowl and shorebirds is of great importance, and various traps for this purpose may be readily constructed by the operator. Such traps usually take the form of the funnel trap on a large scale or, for diving birds, an open pen in about 2 feet of water with a rising door operated from a blind at a distance from the trap. The Biological Survey will furnish details and otherwise assist operators in the construction of these special traps.



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FIG. 7.—Short-handled landing net attached to extension pole, for use in capturing occupants of nest boxes, bank-nesting birds, and others. Photograph taken at bank-swallow colony near Washington, D. C., by the author. The leafy branches in the lower right part of the picture were placed there as a blind for use of the operator.

OPERATION OF TRAPS.

In setting the Government sparrow trap or any other of the cage variety designed for land birds, a place should be selected on open ground close to trees or shrubbery. A trap should not be set actually in a wooded area, but sufficiently close to afford ready access for the birds that it is desired to attract.

Protect the trap from cats by erecting a guard fence. A piece of poultry wire 3 feet wide and 60 feet long will inclose an area approximately 20 feet in diameter and will afford complete protection to birds visiting the trap. An effective guard fence is shown in figure 1.

Crumbled bread has been found to be the best all-round bait, but it is well to use with it finely cracked grain, as wheat or corn, with hemp, millet, or other small seeds, particularly since a large percentage of captures made with this trap are likely to be seed-eating birds. Whole corn or wheat will not answer. Weed seeds, which may be collected in abundance in the fall, make excellent bait. Scatter the bait *thinly* on the ground around the trap, more plentifully at the entrance and in the funnels, and abundantly inside the trap chambers. It is well to save the crusts and larger pieces and place them well inside the trap.

In baiting the large stationary trap, the chamber should be liberally strewn with bread crumbs and seed, and a trail of bait laid through the doors and vestibule. A little bait should then be scattered around the outer door as an appetizer. A supply of water, either for drinking or bathing, placed near any trap, will prove a potent attraction. In the house trap this may be within the large chamber and will be as much appreciated in winter as in summer.

During the winter months suet is an excellent bait. This may be either suspended in the trap chambers, or melted, mixed with chopped nuts, and allowed to harden in half coconut shells or other receptacles. During this season traps may be operated to advantage on feeding shelves.

Visit any trap frequently. Once every three or four hours will suffice during the migration periods, but visits of greater frequency may be necessary during the nesting period, particularly when the young are being fed at the nest. Be particularly careful to visit all traps just before dusk, to see that no birds are confined in them over night.

When a capture has been made with one of the small traps, the gathering cage is placed against the door of the trap and both doors are lowered. The birds are then driven into the cage and the door raised by means of the projecting bent axle. This is particularly convenient when several birds are trapped at once, but should the

trap contain both large and small birds, remove the larger ones first. Do not drive large and small birds together into the gathering cage as the larger individuals are likely to injure the smaller.

For removing birds from the stationary house trap an excellent implement is a small, short-handled net, such as is used by fishermen for a landing net. Force the birds quietly into a corner and slip the net over them without undue haste. Never attempt to capture a bird with the net as it flies across the trap. The chances of breaking a wing or otherwise injuring the bird are great, and it is entirely unnecessary.

HANDLING CAPTURED BIRDS.

In handling small birds the utmost care must be exercised. It is of vital importance that they be so handled that they may be



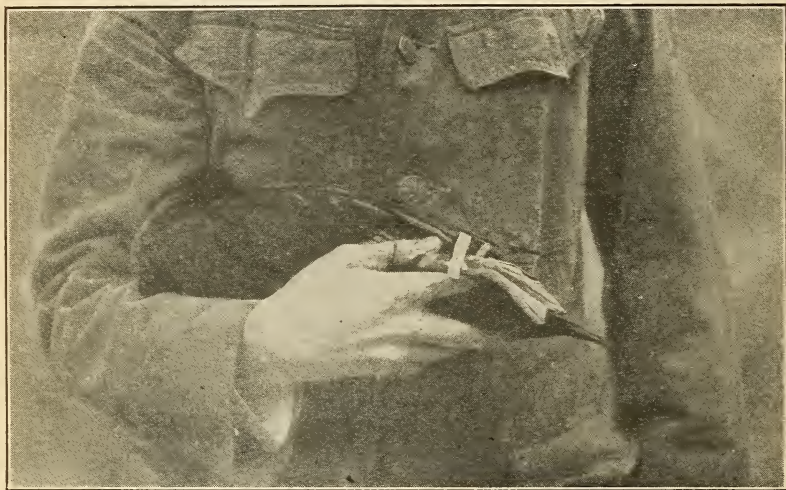
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FIG. 8.—Manner of holding small bird for banding. See also illustration on title-page, showing manner of holding banded bird to read its band number. (Both photographs by S. Prentiss Baldwin.)

liberated in perfect condition. Almost without exception they are highly nervous, and a quick pressure by the operator following some spasmodic struggle of the bird may kill it instantly or so seriously injure it as to make its destruction necessary. Furthermore, it must be remembered that if the data to be secured from the banding of birds are to be of value, the carriers must be strong and healthy and not handicapped in any way. Under no other conditions may their movements be considered as average.

To remove a bird from the gathering cage for banding, reach into the cage (blocking the opening around the arm with the other hand) and work the bird into a corner. It will almost surely be facing away from the operator. Grasp it in such manner as to pinion its neck between the thumb and index finger, and the wing tips, tail, and feet by the little finger closed against the palm. In this position the bird may be held quietly, without using undue force. Strangely enough, securing the bird's head or neck will almost invariably cause it to cease struggling.

If the bird is already banded and only a simple examination is necessary, this position need not be changed, as with the fingers of



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FIG. 9.—Manner of holding large bird for banding. The band shown is half locked. The next steps are to bend it back, complete the lock, and then snip off its excess length (see fig. 11).

the free hand the band may be readily turned and the number read. Or, the bird may be allowed to perch on the little finger, the neck secured between two fingers, as before. Most birds will rest quietly in this position, which has the advantage of permitting an examination of the entire body. (See illustration on title page.)

To place in position for banding, grasp the bird's head lightly but securely with the thumb and the index and second fingers of the other hand; release all other hold and by quickly reversing the position of the bird, draw it through the free hand with its back against the palm and close the little finger over the neck, and the other fingers around the body. This position is exactly the reverse of the original one, in that the bird's feet, wings, and tail are now secured by the second finger, where formerly this was accomplished

by the little finger against the palm. The thumb and index fingers are now free to secure and hold the tarsus while attaching the band (see fig. 8).

For larger and more powerful birds this method will not answer, of course, but securing the bird's head will in almost every case prove the key to the situation. With ducks and other birds of similar size, this is best accomplished by resting the bird on the forearm and hand, held horizontally across the body of the operator, the head and neck passing to the rear under the upper arm, which secures them. This leaves both hands free to hold the feet and wing tips and attach the band (see fig. 9).

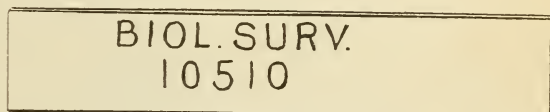


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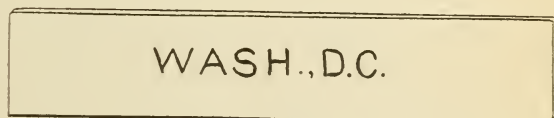
ATTACHING BANDS.

SPLIT-RING BANDS.

Always select the smallest-sized band (fig. 10) that will close around the tarsus (the bare portion of the foot or leg immediately above the toes) without fitting so tightly as to bind or chafe. The band should move freely up and down and turn lightly and smoothly, but it should *not* fit loosely like a bracelet. With large birds this last



b



c

FIG. 10.—Split-ring band (enlarged): (a) Closed; (b) straightened out, outer side; (c) straightened out, inner side.

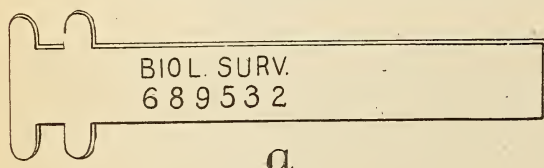
is not so important, but with small perching birds there is considerable danger that twigs or thorns may catch in a band which fits too loosely. Where necessary, and it generally is, lap the edges of the band, but see that the edges of the lap are smooth. Projecting edges are liable to catch in nesting material. While the danger from open bands is great, there is also the danger of lapping the band so far as to cause it to bind or pinch. This might ultimately cause complete paralysis of the foot. A pair of small, pointed pliers, such as

opticians use, are practically indispensable for this work, and with a little practice perfect control can be acquired over this tool and the band placed accurately and rapidly. Any round, pointed instrument will answer to open bands sufficiently to allow the entrance of the bird's leg; a metal pencil is ideal for this work, and, as a pencil will be necessary to jot down the data at the time of banding, an extra tool is thus eliminated.

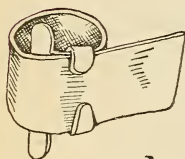
Do not attempt to band birds recently hatched or but a few days old; wait until they are fully fledged and are about ready to leave the nest. The legs of most fully fledged young birds are larger and more

fleshy than those of the adults, so that no allowance for growth need be made. Water birds are an exception to this rule.

Caution.—Should the bird, while in the hand, take advantage of a momentary relaxation of the fingers, and by a quick move regain its freedom, do not attempt to grasp it from the air; rather allow it to escape quietly,



a



b



c

FIG. 11.—Flat-strip band, adjustable: (a) Outer side, straightened out; (b) band partly locked; (c) band fully locked and excess length snipped off.

and trust to recapturing it. The desire to seize an escaping bird is almost instinctive, and it requires thorough control of the nerves and muscles to refrain. But no matter how quick the lunge toward an escaping bird, it will generally net nothing more than a handful of feathers, usually the tail, while the chances of breaking a wing or otherwise injuring the bird by a successful grasp are very great.

FLAT-STRIP BANDS.

Adjustable flat-strip bands, having considerable thickness and equipped with a special locking device, require rather more skill to attach (fig. 11). The pointed pliers, before mentioned, are absolutely necessary and in addition a pair of stout scissors or a pair of diagonal wire cutters will be needed to trim off excess length.

The band may first be roughly shaped around a finger and then opened sufficiently to admit the bird's leg. It is now pressed together and its diameter reduced to the point where it fits smoothly. The

second pair of nibs from the lock end are next bent over and pinched tight with the pliers. The strip is now bent back, the bend pinched together as close as possible, and locked with the first pair of locking nibs. The excess length of the band is then trimmed off and the end pressed down smoothly with the pliers.

In attaching bands to herons, gulls, terns, hawks, or other powerful birds with pointed beaks, the operator should guard his eyes. The stroke of a heron is extremely rapid and is almost invariably aimed at the eyes, because of their brightness. It is also advisable to wear gloves when working with such birds, for a scratch from bill or claw may result in blood-poisoning.

Caution.—See that the number is on the outside. Attaching these bands requires care and patience, for the stiffness of the metal is sufficient to break a bird's leg if not properly handled—put all pressure on the band and not on the leg and there will be no trouble.

RELEASING BIRDS.

The simplest manner of releasing a banded bird is merely to open the hand, allowing the bird to take flight at will. Do not throw the bird into the air or otherwise frighten it into flight, as this will only add to the difficulty of retrapping. Frequently after the hand is opened a bird will lie quietly, not seeming to realize that it is free, and it may even permit gentle stroking or the spreading of a wing. Such occurrences are interesting bits of life history information and should be watched for and encouraged, and also reported in detail on the schedules.

REPORTS.

Write down the band number *at once*; do not trust to memory. It is well to carry to the traps a card upon which may be entered the name and number of each bird handled. Before placing a band in position note its number while opening it and check up the record after attaching. Small numbers of several figures should be read with the greatest care, as the liability of error is correspondingly great. A band wrongly read may totally disqualify what otherwise would be a most valuable set of data. Be particularly careful with "returns," especially if the bird was banded at another station.

Each collaborator should keep a permanent record of his operations, so that his reports can be checked up and verified at any time. As reports will be made from this permanent record it will be well also to note in it such items as the actions of the bird in the trap or in the hand; whether it seems unduly alarmed, fights, or squeals; whether there is an excessive number of body or feather

parasites; malformations or peculiar color patterns; and any other features of interest.

Report results frequently. With the extensive files that this work will require it is of the utmost importance that they be as nearly as possible up to date at all times. This can be accomplished only when the various individual stations send in results and records regularly. Franked envelopes will be supplied for returning the schedules, which during the busy season should be at least once each month. If a schedule becomes filled earlier it may be forwarded at once; but regardless of the number of entries carried it should not be retained longer than one month. The importance of this will be appreciated when it is considered that the "return" data of a bird banded at one station to-day, and trapped at another station a short time later, may be forwarded to the Biological Survey promptly, and it is then important that the original record of banding be on file.

LITERATURE.

The most important American papers on bird banding are the following:

- 1903. COLE, LEON, J., Suggestions for a method of studying the migrations of birds: *Bull. Michigan Orn. Club*, vol. 4, no. 1, p. 19, March.
- 1904. BARTSCH, PAUL, Notes on the herons of the District of Columbia: *Smiths. Misc. Coll.*, vol. 45, Quart. Issue, vol. 1, pp. 104-111.
- 1904. TAVERNER, P. A., The tagging of birds: *Bull. Michigan Orn. Club*, vol. 5, no. 2, p. 50, June.
- 1909. COLE, LEON J., The tagging of wild birds as a means of studying their movements: *Auk*, vol. 26, no. 2, pp. 137-143, April.
- 1910. COLE, LEON J., The tagging of wild birds: report of progress in 1909: *Auk*, vol. 27, no. 2, pp. 153-168, April.
- 1913. CLEAVES, HOWARD H., What the American Bird Banding Association has accomplished during 1912: *Auk*, vol. 30, no. 2, pp. 248-261, April. (Reprinted in *Ann. Rept. Smiths. Inst. for 1913*, pp. 469-479, 1914.)
- 1919. BALDWIN, S. PRENTISS, Bird-banding by means of systematic trapping: *Abstr. Proc. Linnaean Soc. New York*, no. 31, pp. 23-56.
- 1921. BALDWIN, S. PRENTISS, Recent returns from trapping and banding birds: *Auk*, vol. 38, no. 2, April.
- 1921. BALDWIN, S. PRENTISS, The marriage relations of the house wren: *Auk*, vol. 38, no. 2, April.
- 1921. LINCOLN, FREDERICK C., The history and purposes of bird banding: *Auk*, vol. 38, no. 2, April.

The student of migration will also find an invaluable aid in the paper by the late Prof. Wells W. Cooke, entitled, "Bird Migration" (*Bull. 185, U. S. Dept. Agr.*, pp. 47, maps, 1915), which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 10 cents.

PROBLEMS THAT CAN BE SOLVED BY BIRD BANDING.

1. How fast do the individuals of any species travel on their periodic migrations; that is, how many miles per day will any one bird average during these journeys and what is the total time consumed in a trip?

2. Does any one flock continue in the van or is the advance made by successive flocks passing one over the other in alternate periods of rest and flight?

3. Do individuals of any species always follow the same route, and is it identical for both spring and fall flights?

4. Do migrating birds make the same stop-overs every year to feed?

5. How long do birds remain in one locality during the migration, the breeding, or the winter seasons?

6. What is the relation between the breeding and the wintering grounds of individuals; that is, do those birds that breed farthest north winter farthest south, thus jumping over those that occupy the intermediate zone, or do they merely replace the latter individuals as winter residents?

7. Do birds adopt the same nesting area, nest site, and winter quarters during successive seasons?

8. For how many broods will one pair remain mated, and which bird, if not both, is attracted next year to the old nesting site?

9. To what extent do males of a species assist in incubation and brooding?

10. How far from their nests do birds forage for food, and after the young have left the nest, will the parent birds bring them to the feeding and trapping station?

11. To what region do the birds go, particularly the young, that do not return to the vicinity of their original nests?

12. How long do birds live?

For the solution of these and related problems, it is important that the traps always be set on the original site, for birds already have returned to the same traps through four or five consecutive seasons. Many "returns" will, in the course of time, afford answers to the important problems here presented.

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